UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/548,469	04/13/2000	Balaram Sinharoy	AT9-99-129	7436

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EXAMINER
LI, AIMEE J

ART UNIT	PAPER NUMBER
2183	

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Application No.	Applicant(s)
	09/548,469	SINHAROY ET AL.
	Examiner	Art Unit
	Aimee J Li	2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>13 April 2000</u> .

2a) ☐ This action is **FINAL.**   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-40</u> is/are pending in the application.

     4a) Of the above claim(s) <u>15-38</u> is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-14, 39 and 40</u> is/are rejected.

7) ☒ Claim(s) <u>39</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

     If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☐ All b) ☐ Some * c) ☐ None of:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

     a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .	6) ☐ Other:

DETAILED ACTION

1.   Claims 1-14 and 39-40 have been considered.

Papers Submitted

2.   It is hereby acknowledged that the following papers have been received and placed of record in the file: IDS as received on 13 April 2000.

Election/Restrictions

3.   Restriction to one of the following inventions is required under 35 U.S.C. 121:

     I.   Claims 1-14 and 39-40, drawn to a branch predicting mechanism.

     II.   Claims 15-38, drawn to branch predicting within the compiler; classified in class

          717, subclass 136.

4.   Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, branch predicting within the compiler has separate utility such as optimizing code within the compiler.

5.   Because these inventions are distinct for the reasons given above and have required a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

6.   During a telephone conversation with Kelly K. Kordzik on 6 March 2003, a provisional election was made without traverse to prosecute the invention of Group I, claims 1-4 and 39-40. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-38 are withdrawn from further consideration by examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Objections

7.   Claim 39 is objected to because of the following informalities: Please correct the phrase

"determining if the conditional branch instruction if positioned at a specified address in a

sequence of instructions being executed" in claim 39, lines 3-4 to read "determining if the

conditional branch instruction is positioned at a specified address in a sequence of instructions

being executed". Appropriate correction is required.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9.   Claims 39 and 40 rejected under 35 U.S.C. 102(b) as being taught by Patterson and

Hennessy's Computer Architecture A Quantitative Approach Second Edition © 1995 (herein

referred to as Hennessy).

10.   Referring to claim 39, Hennessy has taught a data processing system for predicting

whether a conditional branch instruction will be taken or not taken, the data processing system

comprising the program steps of:

     a.   Determining if the conditional branch instruction if positioned at a specified

            address in a sequence of instructions being executed (Hennessy Pages 176-177

            and 326). In regards to Hennessy, the profiling history includes the addresses

            where the branches occur in the program.

b. Predicting whether the conditional branch instruction will be taken or not taken as a function of the position of the specified address (Hennessy Pages 176-177 and 326).

11. Referring to claim 40, Hennessy has taught wherein the predicting program step will predict taken if the specified address is a multiple of specified number N (Hennessy Pages 176-177 and 326). In regards to Hennessy, the profiling history includes the addresses where the branches occur in the program.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Claims 1-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burgess, U.S. Patent Number 6,642,493 (herein referred to as Burgess) in view of Intel's Pentium® Processor Family Developer's Manual Volume 3: Architecture and Programming Manual © 1995 (herein referred to as Intel).

14. Referring to claim 1, Burgess has taught a method for predicting a result of a conditional branch instruction, comprising the steps of providing a software branch prediction of the conditional branch instruction as a function of the determination if the specified condition register field is used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31). Burgess has not explicitly taught determining if a specified condition register field is used to store a branch condition of the conditional branch instruction. However,

Burgess has taught determining if the condition exists somewhere (Burgess column 4, lines 11-31). Intel has taught using a register with multiple fields to store the condition (Intel pages 3-13 to 3-15). It would have been obvious to a person of ordinary skill in the art to incorporate the register of Intel, <u>because</u> the register allows the condition data to be stored for later reference. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the register of Intel in the device of Burgess so the condition data may be used later in the program.

15.   Referring to claim 2, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be taken if the specified condition register field is used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31).

16.   Referring to claim 3, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be not taken if the specified condition register field is not used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31).

17.   Referring to claim 4, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be not taken if the specified condition register field is used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31).

18.   Referring to claim 5, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be taken if the specified condition register field is not

used to store the branch condition of the conditional branch instruction (Burgess column 4, lines

11-31).

19.   Referring to claims 6, 7, 13, and 14, Burgess has explicitly taught:

        a.   Wherein the specified condition register field is N, where N is an integer

                  (Applicant's Claim 6 and 13)

        b.   Wherein the specified condition register field is a multiple of N (Applicant's

                  Claim 7 and 14)

20.   Intel has taught:

        a.   Wherein the specified condition register field is N, where N is an integer (Intel

                  pages 3-13 to 3-15)

        b.   Wherein the specified condition register field is a multiple of N (Intel pages 3-13

                  to 3-15)

21.   In regards to Intel, it does not matter which field the condition is stored in. Changing the

field the condition is stored in is just shifting the location of the part. See *In re Japikse*, 181 F.2d

1019, 86 USPQ 70 (CCPA 1950). It would have been obvious to a person of ordinary skill in the

art to incorporate the register of Intel, <u>because</u> the register allows the condition data to be stored

for later reference. Therefore, it would have been obvious to a person of ordinary skill in the art

at the time the invention was made to incorporate the register of Intel in the device of Burgess so

the condition data may be used later in the program.

22.   Referring to claim 8, Burgess has taught a processor comprising:

        a.   An instruction fetch unit for fetching a conditional branch instruction (Burgess

                  column 4, lines 11-31)

    b.   Circuitry for providing a software branch prediction of the conditional branch

instruction as a function of the determination if the specified condition register

field is used to store the branch condition of the conditional branch instruction

(Burgess column 4, lines 11-31).

23.   Burgess has not explicitly taught circuitry for determining if a specified condition register

field is used to store a branch condition of the conditional branch instruction. However, Burgess

has taught determining if the condition exists somewhere (Burgess column 4, lines 11-31). Intel

has taught using a register with multiple fields to store the condition (Intel pages 3-13 to 3-15).

It would have been obvious to a person of ordinary skill in the art to incorporate the register of

Intel, because the register allows the condition data to be stored for later reference. Therefore, it

would have been obvious to a person of ordinary skill in the art at the time the invention was

made to incorporate the register of Intel in the device of Burgess so the condition data may be

used later in the program.

24.   Referring to claim 9, Burgess has taught wherein the software branch prediction predicts

that the conditional branch instruction will be taken if the specified condition register field is

used to store the branch condition of the conditional branch instruction (Burgess column 4, lines

11-31).

25.   Referring to claim 10, Burgess has taught wherein the software branch prediction predicts

that the conditional branch instruction will be not taken if the specified condition register field is

not used to store the branch condition of the conditional branch instruction (Burgess column 4,

lines 11-31).

26.   Referring to claim 11, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be not taken if the specified condition register field is used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31).

27.   Referring to claim 12, Burgess has taught wherein the software branch prediction predicts that the conditional branch instruction will be taken if the specified condition register field is not used to store the branch condition of the conditional branch instruction (Burgess column 4, lines 11-31).

Conclusion

28.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aimee J Li whose telephone number is (703) 305-7596. The examiner can normally be reached on M-T 7:30am-5:00pm.

29.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703) 305-9712. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

30.   Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Aimee J. Li
Examiner
Art Unit 2183

March 9, 2003

EDDIE CHAN
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